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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/767,478	01/29/2004	Sor Tin Ng	ID-085.10992-US	5058

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EXAMINER	
AFZALI, SARANG	

ART UNIT	PAPER NUMBER
3726	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/767,478	NG, SOR TIN	
	Examiner	Art Unit	
	Sarang Afzali	3726	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *RCE filed 5/2/2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) *30-34* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29 and 35-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 July 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/2/2007 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-4, 6-10, 14-16 and 25-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Liburdi et al. (US 5,156,321).

As applied to claims 1, 10, 25 and 26, Liburdi et al. teach a method for repairing an article/gas turbine vane comprising the steps of:

providing an article/airfoil/vane having a section requiring dimensional restoration;

providing a rigid sintered preform having first and second layers made from different materials, the first and second layers having mechanical properties similar to

that of the article/vane, the second layer comprising a low melting point component such that the second layer has a lower melting point than the first layer, the first layer having better oxidation resistance than the second layer;

placing the preform adjacent the section of the article/airfoil requiring the dimensional restoration; and

joining the preform to the article/airfoil by subjecting them to heat (col. 3, lines 34-39, col. 4, lines 34-41, Figs. 3A-3B).

As applied to claim 25 & 26, Liburdi et al. teach that the first layer of the material may be similar to the material of the article (col. 3, lines 37-39).

Note that although the second layer (low melting braze alloy) includes same composition as the first layer (col. 4, lines 3-4) and both have mechanical properties similar to the article (col. 3, lines 37-39), nevertheless, they are made from different materials since the second layer also includes an additional composition of melting point depressants (col. 4, lines 1-11).

As applied to claim 2, 14 and 27, Liburdi et al. teach a method wherein the first layer of the preform includes a nickel-based alloy (col. 5, Example 1(a)).

As applied to claims 3, 15 and 28, Liburdi et al. teach a method wherein the second layer (low melting braze alloy) of the preform includes a nickel-based alloy (same powder composition of the initial powder (col. 4, lines 3-5) and a second alloy (Boron and Silicon, col. 4, lines 9-10).

As applied to claims 4, 16 and 29, Liburdi et al. teach a second alloy is a transient liquid phase alloy (col. 4, lines 22-25).

As applied to claim 6, Liburdi et al. teach a method wherein the thickness of the second layer of the preform is in a range of 0.5-3 mm (col. 3, lines 1-3), which is equal to 0.02-0.70 inch that overlaps the claimed range of 0.020-0.030.

As applied to claims 7-9, Liburdi et al. teach subjecting the article and preform to heat wherein the preform melts to conform to the shape of the article (Figs. 3A-3B, col. 3, lines 39-47) and that the article is an airfoil and turbine vane (col. 5, Example 3).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Liburdi et al. in view of Hasz et al. (US 6,302,318).

Liburdi et al. teach the invention cited with the exception of explicitly teaching the thickness of the first layer.

However, Hasz et al. teach a method for repairing a gas turbine component wherein a multi layered preform including a first layer (wear coating foil) with a thickness in the range of about 25 microns to about 1300 microns (col. 6, lines 54-55, equivalent to 0.001 inch to 0.05 inch covering the claimed range 0.005-0.015 inch) and a second

layer (braze foil) made from different materials is provided and is joined (by heating, col. 6, line 37-38) to an article (gas turbine component) (col. 4, line 67, col. 5, lines 1-2) as an effective means of repairing a damaged surface of the article.

It would have been obvious to one of ordinary skill in the art at the time of invention to have provided Liburdi et al. with a suitable thickness, as taught by Hasz et al., to provide an effective bonding of the preform layers to the base layer.

6. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liburdi et al. in view of Chesnes (US 6,365,285).

As applied to claims 11 and 12, Liburdi et al. teach the claimed invention including the temperature range that the article and the preform are subjected to (col. 4, lines 35-68). However, Liburdi et al. fail to explicitly teach the exact duration of each heating step.

Chesnes teaches a method of using an improved braze alloy composition for repairing superalloy articles such as gas turbine engines (Abstract, lines 1-3) wherein the heating step is up to 2350° Fahrenheit maintained between 15 and 45 minutes (col. 3, lines 66-67, col. 4, lines 1-4) in order to provide an improved diffusion heat treatment method to break down the undesirable phases formed by the melting point depressant and diffuse the depressants into the base metal alloy matrix (col. 3, lines 44-47).

It would have been obvious to one of ordinary skill in the art at the time of invention to have provided Liburdi et al. with the heating temperature and duration, as

taught by Chesnes, in order to provide an effective diffusion bonding of the preform with the base substrate (airfoil).

Note that Chesnes' heating duration of between 15 and 45 minutes meets the limitation of between about 2125° to about 2155° for 15 minutes or less and thereafter for 6 ½ hours or less.

7. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Liburdi et al./Chesnes as applied to claim 12 above, and further in view of Rafferty et al. (US 6,004,683).

As applied to claim 13 Liburdi et al./Chesnes teach the claimed invention including the temperature range that the article and the preform are subjected to with the exception of the heating duration of about 2 hours.

However, Rafferty et al. ('683) teach a method of repairing a base metal by brazing a two layered preform on top of it wherein the braze heating step occurs at temperature of at least 800° F to 2300° F maintained for 30 minutes to 3 hours, preferably 2 hours in order to provide a higher quality repair, more closely approaching base metal properties (col. 5, lines 19-30).

It would have been obvious to one of ordinary skill in the art at the time of invention to have provided Liburdi et al./Chesnes with the heating temperature and duration, as taught by Rafferty et al. ('683), in order to provide an effective diffusion bonding of the preform with the base substrate (airfoil).

8. Claims 17-20 and 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liburdi et al. in view of Draghi et al.

As applied to claim 17, Liburdi et al. teach a method for repairing an article/gas turbine component comprising the steps of:

providing an article/airfoil/vane having a section requiring dimensional restoration;

providing a rigid sintered preform having first and second layers made from different materials, the first and second layers having mechanical properties similar to that of the article/vane, the second layer comprising a low melting point component such that the second layer has a lower melting point than the first layer, the first layer having better oxidation resistance than the second layer;

placing the preform adjacent the section of the article/airfoil requiring the dimensional restoration; and

joining the preform to the article/airfoil by subjecting them to heat (col. 3, lines 34-39, col. 4, lines 34-41, Figs. 3A-3B).

Liburdi et al. teach the claimed invention with the exception of explicitly teaching that the preform is placed adjacent to a convex side of the airfoil.

Draghi et al. teach a method for repairing a vane of a gas turbine airfoil wherein a multi layered preform is provided and placed and joined (by heating, col. 4, lines 8-9) to an airfoil (gas turbine vane 1, see Figure) at the convex surface (3) side such that the preform softens and conforms to the airfoil (see Figure) to provide a controlled buildup

to a precise requirement and achieve a homogenous substrate alloy configuration (col. 5, lines 25-27).

It would have been obvious to one of ordinary skill in the art at the time of invention to have selected a turbine vane as Liburdi's turbine engine component, as taught by Draghi et al., to provide a necessary repair to a worn or damaged wear coating.

As applied to claims 18 and 19, Liburdi et al. teach the step of preparing includes removing any protective coatings on the turbine component and cleaning of the vane (col. 3, lines 21-31).

As applied to claim 20, Liburdi et al. teach the preform and the turbine component are heated in a furnace (col. 3, lines 5054).

As applied to claim 22, Liburdi et al. teach a method wherein the first layer of the preform includes a nickel-based alloy (col. 5, Example 1(a)).

As applied to claims 23, Liburdi et al. teach a method wherein the second layer (low melting braze alloy) of the preform includes a nickel-based alloy (same powder composition of the initial powder (col. 4, lines 3-5) and a second alloy (Boron and Silicon, col. 4, lines 9-10).

As applied to claims 24, Liburdi et al. teach a second alloy is a transient liquid phase alloy (col. 4, lines 22-25).

9. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Liburdi et al. in view of Draghi et al. as applied to claim 20 above, and further in view of Schaeffer et al. (US 5,674,610).

Liburdi et al./Draghi et al. teach the claimed invention with the exception of the convex side of the airfoil facing upwards during the heating step.

However, Schaeffer et al. teach a method for applying a multi layered preform coating (60 including layers 62 and 64, Fig. 6) to a turbine vane (substrate 32, Fig. 6) wherein the coating (60) attached on top of the substrate (32) are facing upward when placed in the container (70, Fig. 6, col. 6, lines 34-41) and heated (Fig. 3, numeral 48, col. 7, lines 29-30) to prevent formation of any further oxide during heating and chromium deposition (col. 6, lines 65-66). It would have been obvious to one of ordinary skill in the art at the time of invention to have oriented the turbine component of Liburdi et al./Draghi et al. in an upward position during the heating step, as taught by Schaeffer et al., in order to provide an effective and secure bonding between the preform and the turbine vane.

10. Claims 35, 36 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liburdi et al. in view of Krumpelt et al. (US 6,843,960).

As applied to claims 35, 36 and 38, Liburdi et al. teach the invention cited including the compositions of the first and second layers but fail to explicitly teach using a pressing die and the step of sintering to make the preform.

Krumpelt et al. teach a method of manufacturing a powder composition using pressing die to form a next layer directly on top of a previous layer followed by sintering step (Fig. 1, claim 1, lines 1-14) in order to provide a final product with good corrosion resistance and that has essentially a uniform composition throughout (col. 2, lines 36-40). It would have been obvious to one of ordinary skill in the art at the time of invention to have provided Liburdi et al. with pressing and sintering steps, as taught by Krumpelt et al., in order to provide an effective and secure bonding with uniform composition throughout the joint between the preform and the turbine vane.

11. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Liburdi et al. in view of Draghi et al. as applied to claim 17 above, and further in view of Krumpelt et al. (US 6,843,960).

Liburdi et al./Draghi et al. teach the invention cited including the compositions of the first and second layers but fail to explicitly teach using a pressing die and the step of sintering to make the preform.

Krumpelt et al. teach a method of manufacturing a powder composition using pressing die to form a next layer directly on top of a previous layer followed by sintering step (Fig. 1, claim 1, lines 1-14) in order to provide a final product with good corrosion resistance and that has essentially a uniform composition throughout (col. 2, lines 36-40). It would have been obvious to one of ordinary skill in the art at the time of invention to have provided Liburdi et al./Draghi et al. with pressing and sintering steps, as taught

by Krumpelt et al., in order to provide an effective and secure bonding with uniform composition throughout the joint between the preform and the turbine vane.

Response to Arguments

12. Applicant's arguments with respect to claims 1-29 have been considered but are moot in view of the new ground(s) of rejection.

13. Applicant's main argument is that the none of Hasz, Rowe, Rafferty '169, Draghi, Chesnes, Rafferty '683, or Schaeffer disclose, nor even suggest, neither alone nor in combination, using a rigid sintered preform to restore dimensions to an article or airfoil, as recited in independent claims 1, 10, 17 and 25 of Applicant's invention.

The Examiner respectfully disagrees with the above arguments and notes that the abovementioned references are only relied upon to teach the deficiencies of the newly applied reference Liburdi et al.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sarang Afzali whose telephone number is 571-272-8412. The examiner can normally be reached on 7:00-3:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bryant can be reached on 571-272-4526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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7/12/2007

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7/17/07